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SUBJECT: BRAZIL: RESPONSE TO CIVIL NUCLEAR WORKING GROUP REQUEST FOR
PLANS TO EXPAND NUCLEAR ENERGY

REF: STATE 127468

11. THIS IS A RESPONSE TO ACTION REQUEST: Please see para 3.

12. SUMMARY. Due to its overwhelming dependence on hydro power and growing electricity demand, Brazil is looking to diversify its energy matrix and increase capacity with plans that include expansion of its civil nuclear program. The program anticipates completing construction of its third nuclear reactor - Angra III as well as building 4-6 more in the next twenty years. Scope of opportunities for U.S. companies will depend upon Brazil's strategy for building and maintaining its portfolio of nuclear reactors. There will be fewer opportunities if Brazil decides to build on its two latest with German technology (now jointly owned by French company, Areva) based reactors. Self-sufficiency continues to be of great concern to Brazil. This view will impact Brazil's selection of a partner for its new reactors. Partners willing to transfer technology, train a wholly Brazilian work force, and provide other incentives like fuel enrichment and efficient uranium mining technology, would have a competitive edge. Financing options and job creation will also be important factors. France portends to be the biggest competitive threat at this point. END SUMMARY

13. RESPONSES TO CIVIL NUCLEAR SECTOR REPORTING REQUESTS.

Overview of Civil Nuclear Power Program

-- Are there any plans to expand your country's civil nuclear power program (including any associated activities such as uranium mining, fuel supply, reactor construction, and spent fuel management)?

Yes - the Government of Brazil (GoB) is expanding its nuclear power program in the areas of nuclear reactors, uranium mining, fuel supply, and spent fuel management.

Nuclear reactors: Brazil reportedly plans to build 4-6 reactors by 2030 with first units expected to begin operations in the 2017-2018 timeframe. Currently, Brazil has two reactors - Angra I (built by Westinghouse of the U.S.) and Angra II (built by Siemens/KWU of Germany); they provide about 2.5% of the country's electricity. Construction is expected to restart on the third reactor, Angra III, with a completion date (recently postponed by one year due to licensing issues) of 2015.

Uranium mining: Brazil fully controls its uranium industry through state-owned Industrias Nucleares do Brasil (INB). With the world's sixth largest uranium reserve of 500,000 tons, Brazil has enough to run 6 reactors for 250 years. Brazil expects to export surplus uranium. Its first priority, however, is to secure enough supplies for domestic use. Brazil plans to double its mining production by 12012. There are opportunities for U.S. business to provide services and technology for more efficient mining.

Fuel supply: Today, Brazil relies partly on foreign companies like Urenco (headquartered in the U.K.) to enrich uranium for its civil nuclear reactors. Brazil's Resende nuclear fuel facility in the

State of Rio de Janeiro is expected to produce 20-30 tons of enriched uranium per year, or 60% of the country's needs. Resende is expected to fulfill all of Brazil's enriched uranium needs once the facility is fully operational.

Spent fuel management: Spent fuel is currently stored in multiple temporary sites. As part of Brazil's long term strategy for waste storage, Brazil's National Commission on Nuclear Energy (CNEN) will launch a new company to handle waste management and plans to begin construction of a medium- and low-level waste reprocessing facility in 2014. An above ground repository is expected to be built by 2026.

-- For expanding nuclear power programs, describe your country's underlying motivations (e.g., current or anticipated power shortages, energy security, or other industrial uses, such as desalination).

Brazil's current energy matrix is dominated by hydro power which generates 84% of the country's electricity. A growing economy and an inability to meet future demand from hydro power has prompted Brazil's plan to significantly increase its electricity generation capabilities. Due to Brazil's large supply of uranium, the Government of Brazil views nuclear energy as a viable alternative energy source for the country's energy matrix.

-- If there are plans to expand nuclear power, describe the government's role in the financing of its civil nuclear sector. For example, does the government provide subsidies, tax breaks, loan guarantees, or other financial incentives? Are some or all nuclear power plants state-owned and operated? Would they seek financing from international investment banks and organizations or consortium arrangements?

State-owned Eletronuclear currently operates Angra I and Angra II plants and will be responsible for Angra III as well. Financing of Angra III is estimated at USD 1.8 billion, and the Brazilian government is still seeking a strategic partner to assist in financing the reactor. BNDES, Brazil's development bank, is expected to play a significant role.

-- Describe your country's nuclear regulatory authority. Is it independent of the agency promoting nuclear power and/or operating nuclear power plants? What are its inspection/enforcement powers? How large is it (i.e., how many people does it employ)? Are there plans to expand it?

CNEN currently plays the joint role of regulator and promoter. It is independent of nuclear power plant operations which are run by the state-owned Eletronuclear. CNEN has the authority to pass regulations, approve licenses, inspect nuclear installations, and to enforce its policies.

CNEN President Odair Dias Gongalves has confirmed that the GoB has decided to create a separate regulatory agency. All 400 of CNEN's regulatory personnel will be transferred to the new agency which will report directly to the Ministry of Science and Technology. CNEN will maintain the rest of its 2,300 staff, and will continue to oversee the state-owned companies which handle uranium mining and enrichment and nuclear power generation. Additionally, Brazil plans to create two additional state-owned companies under CNEN which will focus on nuclear and radioactive waste management as well as radio-pharmacy.

-- Does your country have a domestic nuclear liability law? If so, please summarize its major elements. In particular, is there a minimum level of liability coverage required for operators? If your country is not party to an international liability regime, is there any consideration being given to joining one? If so, which international liability regime (Vienna Convention, Paris Convention, Convention on Supplementary Compensation for Nuclear Damage) is being considered.

Brazil has been a signatory of the Convention on Civil Liability for

Nuclear Damage (Vienna Convention) since 1993.

-- Is the manufacturing base in your country (including high-tech components and heavy industry) involved in nuclear-related products or services? Does it seem likely that any components or contracting services for new plants could be sourced locally, or would the majority of these need to be imported?

Through technology transfer from previous nuclear plant constructions and a home-grown knowledge base, Brazil has some capability to manufacture certain components and assemble fuel elements. Angra III (under construction) follows the German model - mainly because Brazil purchased the reactor parts in the 1970s and have had them sitting in storage for over 30 years. Brazil appears to have the domestic manufacturing base and knowledge to finish construction of Angra III. For the new plants, however, it is not clear what model Brazil will follow and or whether they will require an update of their manufacturing/knowledge base including technology transfer and foreign sourcing.

Brazil's Energy Minister and Deputy Ministers have expressed their interest on multiple occasions in sourcing from the United States - noting Westinghouse's involvement with the first of the two plants currently in service. Responding to Brazilian government interest, DOE has invited Brazil to form a civilian nuclear working group to discuss opportunities for future cooperation - a very promising area both in policy terms and commercially.

-- How extensive is your country's nuclear-trained workforce? Does your country have a significant engineering, technician, and construction base that could be readily converted into a nuclear workforce (e.g., engineers, high precision manufacturing, high

quality construction, robust quality assurance programs)? Will an expansion of civil nuclear power require a significant foreign workforce? Are programs in place, or being developed, for training of domestic personnel (e.g., in skilled trades and nuclear regulation)?

Brazil has decades of experience with civil nuclear power - its first nuclear power reactor became operational in 1985. GoB has historically pushed for self-reliance in building and running its civil nuclear program. Brazil has made headway towards self-sufficiency in operating its two nuclear reactors and the construction of the third (Angra III).

If Brazil chooses to continue with its current technology, as showcased by Angra II and III, for its additional plants, the need for foreign assistance for goods and services would be lower compared to a different, more modern technology offering. Currently, Brazil is looking at Westinghouse, Atomenergoprom (Russia), and Areva (ex-Siemens, now a French company) as potential suppliers for its future projects.

Opportunities for U.S. Industry

-- Does your country have any current or anticipated nuclear-related tenders? If so, please describe the tender/selection process for new contracts, its timing, and indicate any U.S. firms considering bidding.

Yes, the aforementioned 4-6 reactors plus possible development of uranium export industry. As yet, timing is uncertain. Westinghouse is expected to bid. General Electric (GE) may bid if bid specifications do not preclude GE's Boiling Water Reactor (BWR) technology. Brazil's current nuclear reactors are all Pressurized Water Reactors (PWR).

Bid selection process is not always transparent in Brazil. Once authorized, Eletronuclear would send the international tender announcement for dissemination. By law, the Brazilian Government may not make a distinction between domestic and foreign-owned

companies. However, in case of a tie in the tendering process, the law's implementation regulations give preference to goods and services supplied by Brazilian firms.

Brazil is not a signatory of the WTO multilateral Agreement on Government Procurement, and therefore, does not necessarily use the same procedures as other signatories. Most government procurement processes are open to international competition, either through direct bidding, consortia, or imports. However, many of the larger bids can become very political and could lead to unilateral single source procurement decisions.

-- What nuclear sector opportunities do you foresee for U.S. industry (e.g., feasibility studies or other consulting services, plant construction management, reactor sales, fuel cycle service provision, plant operations, waste management, or logistics)?

All of the above.

-- What are the primary companies (domestic and foreign) involved in (or considering involvement in) your country's civil nuclear sector? Please include utilities, plant operators, fuel cycle service providers, technology vendors, and major construction or consulting firms

Westinghouse (U.S.), Atomenergoprom (Russia), and Areva (France) are the primary companies expected to bid as technology vendors and consultants.

Foreign Competitors

-- Are there other nuclear supplier countries engaging your country on its civil nuclear power program? Please provide details wherever possible, including on any formal or potential agreements such as MOUs, legal frameworks on nuclear commerce, or information exchange agreements.

Brazil and France are expected to sign a co-operation agreement on nuclear defense and energy on December 23 2008. France may to be

the single biggest competitor to U.S. nuclear commercial interests in this area.

In March 2008, Brazil and Argentina announced the formation of a bilateral Nuclear Energy Commission (COBEN), and stated their intention to create a joint state company (EBEN) that will develop compact nuclear reactors and enrich uranium.

In May 1996, Brazil and Canada signed a nuclear cooperation agreement. The Agreement scope includes the supply of information, including technology; the supply of nuclear material and equipment; technical training; rendering of technical assistance and services; and the exploration for and development of uranium resources.

Russia and Brazil are drawing closer on the issue of civilian nuclear power technology transfer, especially in the exploration and production of uranium.

-- Are there any political considerations your country may take into account when choosing to cooperate with competing nuclear supplier states?

As demonstrated by recent rhetoric by Brazil asserting its political autonomy from the United States, Brazil may lean towards non-U.S. technology as a show of independence. However, more pragmatic aspects like technology transfer, financing, long term self-sufficiency and job creation are expected to take precedence.

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